

THE AMERICAN HERITAGE
DICTIONARY
OF THE ENGLISH LANGUAGE

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Tsing-hai (ch'ing'hi'). Also Ch'ing-hai, Ching-hai. A province of west-central China, occupying 278,378 square miles. Population, 2,050,000. Capital, Sining.

Tsing-tao (ch'ing'dou'). A city of eastern China, a port on the Yellow Sea in Shantung Province. Population, 1,121,000.

Tsing-yuan. The former name for Paoting.

Tsi-tsi-har (ch'ch'ch'har', ts'etse'). A city of northeastern China in Heilungkiang Province, of which it is the former capital. Population, 704,000.

tsp. teaspoon; teaspoonful.

T-square (tē'skwār') *n.* A rule having a short, sometimes sliding, perpendicular crosspiece at one end, used by draftsmen for establishing and drawing parallel lines.

Tsu-ga-ru Strait (tsōō'gā-rōō'). A strait between northern Honshu and southern Hokkaido, Japan.

tsu-na-mi (tsōō'nā'mē) *n.* A very large ocean wave caused by an underwater earthquake or volcanic eruption. Also loosely called "tidal wave." [Japanese: *tsu*, port, harbor + *nami*, wave.]

tsu-ris (tsōō'ris, tsōō'ris) *n.* Also *tsu-ris*. A series of misfortunes; a state or period of suffering; problems: *tsuris with his wife, his landlord, and his boss.* [Yiddish, "trouble," "distress."]

Tsu-shi-ma (tsōō-shē'mā). An island, 271 square miles in area, in Korea Strait between southern South Korea and Kyushu, Japan; near the site of a naval battle of the Russo-Japanese War in which the Russians were defeated (1905).

tsu-tsu-ga-mu-shi disease (tsōō'tsā-gā-mōō'shē). *Pathology.* Scrub typhus (see). [Japanese *tsutsugamushi*: *tsutsuga*, illness + *mushi*, an insect, mite.]

tswana (tswā'nā, sā-) *n.* 1. A Bantu people of southern Africa, living mainly in Botswana. 2. The Sotho language of the Tswana people.

Tu. Tuesday (unofficial).

T.U. trade union.

Tu-a-mo-tu Archipelago (tōō'ā-mō'tōō). A group of islands, 330 square miles in area, in French Polynesia in the South Pacific. Also called "Low Archipelago."

Tuan (twān) *n.* A Malayan form of respectful address, equivalent to the English "Sir" or "Mister." [Malay, master, lord.]

Tua-reg (twā'rēg') *n., pl.* *Tuareg* or *-regs*. A member of one of the tall, nomadic, Hamitic-speaking peoples who occupy western and central Sahara and an area along the Niger and who have adopted the Moslem religion. [Arabic *Tawāriq*.]

tu-a-ta-ra (tōō'ā-tā'rā) *n.* A lizardlike reptile, *Sphenodon punctatus*, of New Zealand, the only surviving representative of the order Rhynchocephalia that flourished during the Mesozoic era. [Maori *tuatara*.]

tub (tūb) *n.* 1. a. A round, open, flat-bottomed vessel, usually wider than it is tall, originally made of staves held together with hoops, and used for packing, storing, or washing. b. The amount held by such a vessel. c. The contents of such a vessel: *a tub of butter*. 2. a. A bathtub (see). b. Chiefly *British Informal*. A bath taken in a bathtub. 3. *Informal*. Something resembling a tub in shape or size, especially a wide, clumsy, slow-moving boat or a stout person. 4. a. A bucket used for conveying ore or coal up a mine shaft. b. A coal car used in a mine. —*v.* *tubbed*, *tubbing*, *tubs*. —*tr.* 1. To pack or store in a tub. 2. To wash or bathe in a tub. —*intr.* To take a bath. [Middle English *tubbe*, *tobbe*, from Middle Dutch and Middle Low German *tubbet*.] —*tub'ba-ble* *adj.* —*tub'ber* *n.*

tu-ba (tōō'bā, tōō'bā) *n., pl.* *-bas* or *-bae* (-bē) (for sense 3). 1. A large, valved, brass musical wind instrument with a bass pitch. [Also called "bass horn." 2. A reed stop in an organ, having eight-foot pitch. 3. An ancient Roman war trumpet. [Italian, from Latin, a trumpet, akin to Latin *tubus*, *TUBE*.]

tu-bal (tōō'bāl, tōō'bāl) *adj.* Of, pertaining to, or occurring in a tube, especially the Fallopian tube.

tu-bate (tōō'bāt', tōō'bāt') *adj.* Forming or having a tube.

tub-by (tūb'ē) *adj.* *-bier*, *-biest*. 1. Short and fat. 2. Having a dull sound; lacking resonance. —*tub'bi-ness* *n.*

tube (tōōb, tōōb) *n.* 1. A hollow cylinder that conveys a fluid or functions as a passage. 2. An organic structure so shaped or so functioning; a duct. 3. A small, flexible cylindrical container sealed at one end and having a screw cap at the other, for pigments, toothpaste, mustard, or other pastelike substances. 4. The cylindrical part of a wind instrument. 5. a. An electron tube (see). b. A vacuum tube (see). 6. *Botany*. The lower, joined part of a gamopetalous corolla or a gamosepalous calyx. 7. a. A subway tunnel. b. The subway. —*tr.v.* *tubed*, *tubing*, *tubes*. 1. To provide with a tube or tubes; insert a tube in: *tube a tire*. 2. To place in or enclose in a tube. [French, from Latin *tubus*.] See also *tuba*.]

tube foot. One of the numerous external, fluid-filled muscular tubes of echinoderms, such as the starfish, serving primarily as organs of locomotion.

tube-less tire (tōōb'līs, tōōb'līs). A pneumatic vehicular tire in which the air is held in the assembly of casing and rim without an inner tube.

tu-ber (tōō'bār, tōō'bār) *n.* 1. *Botany*. A swollen, usually underground stem, such as the potato, bearing buds from which new plant shoots arise. 2. *Anatomy*. A swelling; tubercle. [Latin *tuber*, a lump, swelling, tumor. See *teue-* in Appendix.*]

tu-ber-cle (tōō'bār-kāl, tōō'bār-kāl) *n.* 1. A small, rounded prominence or process, such as a wartlike excrescence on the roots of some leguminous plants or a knoblike process in the skin or on a bone. 2. *Pathology*. a. A nodule or swelling. b. The characteristic lesion of tuberculosis. [Latin *tuberculum*, diminutive of *tuber*, a lump, *TUBER*.]

tubercle bacillus. *Abbr.* *t.b.*, *T.B.* A rod-shaped bacterium, *Mycobacterium tuberculosis*, that causes tuberculosis.

tuck (tūk) *v.* *tucked*, *tucking*, *tucks*. —*tr.* 1. To make one or more folds in. 2. To gather up and fold, thrust, or turn in in order to secure or confine: *tuck a scarf into a shirt*. 3. a. To put in a snug spot. b. To put in an out-of-the-way and snug place: *a cabin tucked among the pines*. c. To store in a safe spot; save. Used with *away*: *tuck away a bit of lace*; *tuck away millions*. 4. To draw in; contract. —*intr.* 1. To make tucks. 2. To submit readily to being tucked. —*tuck* in (or *away*). Chiefly *British Informal*. To consume (food) heartily or greedily; to gorge. —*tuck* in (or *into*) *bed*. To put to bed and cover snugly.

—*n.* 1. A flattened pleat or fold, especially a very narrow one stitched in place. 2. A thrusting, wrapping, or folding in of an edge. 3. *Nautical*. The part of a ship's hull under the stern where the ends of the bottom planks come together. 4. *British Slang*. Food, especially sweets and pastry. [Middle English *tucken*, *tucken*, to punish, tug at, pull, Old English *tūciant*, to punish, torment.]

tuck (tūk) *n.* *Scottish*. A beat or tap, especially on a drum. [From obsolete *tio* *uk*, to beat the drum, sound the trumpet, from Middle English *tucken*, from Old North French *toquer*, to strike, touch, from Vulgar Latin *toccare* (unattested), to TOUCH.]

tu-ber-cu-lar (tōō'būr'kyā-lār, tōō'būr'kyā-lār) *adj.* 1. Of, relating to, or covered with tubercles; tuberculate. 2. Of, relating to, or afflicted with tuberculosis. —*n.* A person having tuberculosis.

tu-ber-cu-late (tōō'būr'kyā-līt, tōō'būr'kyā-līt) *adj.* Also *tu-ber-cu-la-ted* (-lā'tid). 1. Having tubercles. 2. Tubercular. —*tu-ber-cu-late-ly* *adv.* —*tu-ber-cu-la-tion* *n.*

tu-ber-cu-lin (tōō'būr'kyā-līn, tōō'būr'kyā-līn) *n.* A substance derived from cultures of tubercle bacilli, used in the diagnosis and treatment of tuberculosis. [Latin *tuberculum*, *TUBERCLE* + *-in*.]

tu-ber-cu-lous (tōō'būr'kyā-lōs, tōō'būr'kyā-lōs) *adj.* 1. Resembling tuberculosis. 2. Resembling a tubercle.

tu-ber-cu-lo-sis (tōō'būr'kyā-lō'sīs, tōō'būr'kyā-lō'sīs) *n.* *Abbr.* *T.B.*, *T.B.* 1. A communicable disease of man and animals, caused by a microorganism, *Mycobacterium tuberculosis*, and manifesting itself in lesions of the lung, bone, and other parts of the body. 2. Tuberculosis of the lungs. In this sense, also called "consumption," "pulmonary tuberculosis." [New Latin: Latin *tuberculum*, *TUBERCLE* + *-osis*.]

tu-ber-cu-lous (tōō'būr'kyā-lōs, tōō'būr'kyā-lōs) *adj.* 1. Of, relating to, or having tuberculosis. 2. Of, affected with, or caused by tubercles. [New Latin *tuberculosus*, from Latin *tuberculum*, *TUBERCLE*.]

tube-rose (tōōb'rōz', tōōb'rōz', tōōb'rōz', tōōb'rōz') *n.* A tuberous plant, *Polianthes tuberosa*, native to Mexico; cultivated for its fragrant white flowers. [New Latin (*Polianthes*) *tuberosa*, from the feminine of Latin *tuberōsus*, *TUBEROUS*.]

tu-ber-ose. Variant of *tuberous*.

tu-ber-os-i-ty (tōō'bār'ōs'ē-tē, tōō'bār'ōs'ē-tē) *n., pl.* *-ties*. A projection or protuberance, especially one at the end of a bone for the attachment of a muscle or tendon.

tu-ber-ous (tōō'bār'ōs, tōō'bār'ōs) *adj.* Also *tu-ber-ose* (-bār'ōs'). 1. *Botany*. a. Producing or bearing tubers. b. Resembling a tuber: *a tuberous root*. 2. *Rare*. Covered with small, rounded projections; knobby. [Latin *tuberōsus*, full of lumps, from *tuber*, a lump, *TUBER*.]

tu-bi-fex (tōō'bā-fēks', tōō'bā-fēks') *n., pl.* *tubifex* or *-fexes*. Any of various small, slender, reddish freshwater worms of the genus *Tubifex*, often used as food for tropical aquarium fish. [New Latin *Tubifex*: Latin *tubus*, *TUBE* (each one is partially enclosed in a tube) + *-fex*, "maker" (see *dhē-* in Appendix.*)]

tub-ing (tōō'bīng, tōō'bīng) *n.* 1. Tubes collectively. 2. A system of tubes. 3. A piece or length of tube. 4. Tubular fabric, such as that used for making pillowcases.

Tub-man (tūb'mān), *Harriet*. 1820?–1913. American Negro abolitionist leader.

Tub-man (tūb'mān), *William Vacanarat Shadrach*. Born 1895. Liberian statesman; president of Liberia (since 1944).

tub thumper. *Informal*. A rafter; soapbox orator.

Tu-bu-ai Islands (tōō'bū'āi). An island group, 115 square miles in area, of southern French Polynesia in the South Pacific. Also called "Austral Islands."

tu-bu-lar (tōō'bū'ār, tōō'bū'ār) *adj.* 1. Of or pertaining to a tube or tubes. 2. Having the form of a tube. 3. Constituting or consisting of a tube or tubes.

tu-bu-late (tōō'bū'ār, tōō'bū'ār) *adj.* Also *tu-bu-late* (-lā'tid). 1. Formed into or resembling a tube; tubular. 2. Having a tube. [Latin *tubulatus*, from *tubulus*, diminutive of *tubus*, *TUBE*.] —*tu-bu-la-tion* *n.* —*tu-bu-la-tor* (-lā'tār) *n.*

tu-bule (tōō'bū'āl, tōō'bū'āl) *n.* A very small tube or tubular structure. [Latin *tubulus*, diminutive of *tubus*, *TUBE*.]

tu-bu-li-fer-ous (tōō'bū'āl-fēr'ōs, tōō'bū'āl-fēr'ōs) *adj.* Having or consisting of tubules. [TUBULE + *-ferous*.]

tu-bu-li-flo-rous (tōō'bū'āl-flōr'ōs, tōō'bū'āl-flōr'ōs) *adj.* Having flowers or florets with tubular corollas. [From *TUBULE* + *-floreus*.]

tu-bu-lous (tōō'bū'āl-lōs, tōō'bū'āl-lōs) *adj.* 1. Tubular. 2. Composed of tubes or having tubular parts. [New Latin *tubulosus*; from Latin *tubulus*, *TUBULE*.] —*tu-bu-lous-ly* *adv.*

T.U.C. *British*. Trades Union Congress.

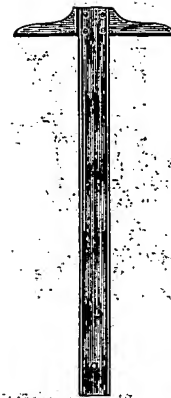
Tu-ca-na (tōō-kā'nā, tōō-kā'nā) *n.* A constellation in the polar region of the Southern Hemisphere near Indus and Hydrus, containing the smaller Magellanic cloud (see). [Probably Tupi *tucana*, *TOUCAN*.]

tu-chun (dōō'jūn') *n., pl.* *-chūns* or *tuchun*. A Chinese military governor of a province. [Chinese *tū'chūn*: *tū'*, to supervise + *'chūn*, army, troops.] —*tu'chun-ate* *n.* —*tu'chun-ism* *n.*

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T-square



tuatara



tuba

Suture

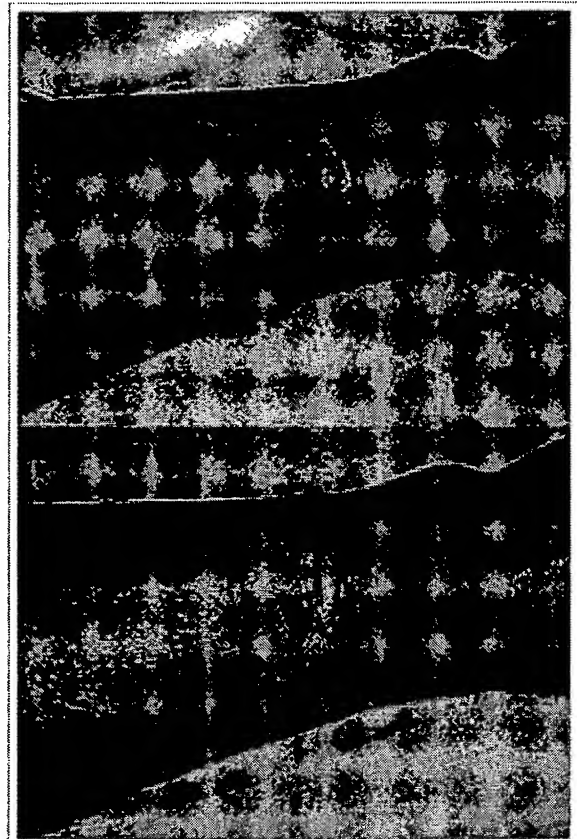
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"Suture" can also refer to the sutures of skull or in geology a suture can refer to a boundary line of contact

Sutures are the stitches doctors, and especially surgeons, use to hold skin, internal organs, blood vessels and all other tissues of the human body together, after they have been severed by injury or surgery. They must be strong (so they do not break), non-toxic and hypoallergenic (to avoid adverse reactions in the body), and flexible (so they can be tied and knotted easily). In addition, they must lack the so called "wick effect", which means that sutures must not allow fluids to penetrate the body through them from outside, which could easily cause infections.

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- 3 Sizes of sutures
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A wound before and after being closed by sutures

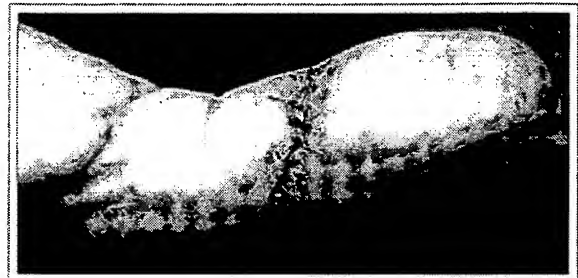
Absorbable and nonabsorbable sutures

Absorbable sutures are made of materials which are broken down in tissue after a given period of time, which depending on the suture can be from ten days to four weeks. They are used therefore in many of the inner tissues of the body. In most cases, three weeks is sufficient for the wound to close firmly. The suture is not needed any more, and the fact that it disappears is an advantage, as there is no foreign material left inside the body and no need for the patient to have the sutures removed.

Absorbable sutures were originally made of the intestines of sheep, the so called catgut. The manufacturing process was similar to that of natural musical strings for violins and guitars, and also of natural strings for tennis racquets. The inventor, a 10th century surgeon named al-Zahrawi reportedly discovered the dissolving nature of catgut when his lute's strings were eaten by a monkey. Today, gut sutures are made of specially prepared beef and sheep intestine, and may be untreated (plain gut), tanned with chromium salts to increase their persistence in the body (chromic gut), or heat-treated to give more rapid absorption (fast gut). However, the major part of the absorbable sutures used are now made of synthetic polymer fibers, which may be braided or monofilament; these offer numerous advantages over gut sutures, notably ease of handling, low cost, low tissue reaction, consistent performance and guaranteed non-toxicity. (In Europe and Japan, gut sutures have been banned due to concerns over bovine spongiform encephalopathy, although the herds from which gut is harvested are certified BSE-free.)

Each major suture manufacturer has its own proprietary formulations for its brands of synthetic absorbable sutures; various blends of polyglycolic acid, lactic acid or caprolactone are common.

Nonabsorbable sutures are made of materials which are not metabolized by the body, and are used therefore either on skin wound closure, where the sutures can be removed after a few weeks, or in some inner tissues in which absorbable sutures are not adequate. This is the case, for example, in the heart and in blood vessels, whose rhythmic movement requires a suture which stays longer than three weeks, to give the wound enough time to close. Other organs, like the bladder, contain fluids which make absorbable sutures disappear in only a few days, too early for the wound to heal. Inflammation caused by the foreign protein in absorbable sutures can amplify scarring, so if removable sutures are less antigenic it would represent a way to reduce scarring.



8 nonabsorbable sutures in a person's left thumb.

There are several materials used for nonabsorbable sutures. The most common is a natural fiber, silk, which undergoes a special manufacturing process to make it adequate for its use in surgery. Other nonabsorbable sutures are made of artificial fibers, like polypropylene, polyester or nylon; these may or may not have coatings to enhance their performance characteristics. Finally, stainless steel wires are commonly used in orthopedic surgery and for sternal closure in cardiac surgery.

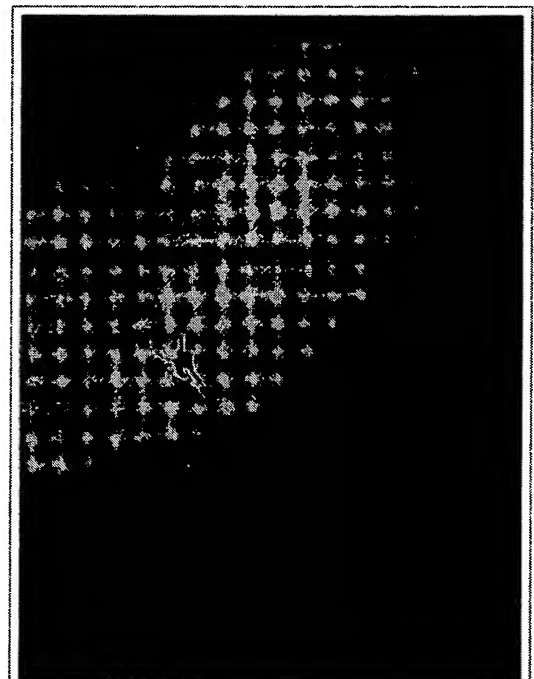
Surgical needles for use with sutures

Traumatic needles are needles with holes or eyes which are supplied to the hospital separate from their suture thread. The suture must be threaded on site, as is done when sewing at home.

Atraumatic needles with sutures comprise an eyeless needle attached to a specific length of suture thread. The suture manufacturer swages the suture thread to the eyeless atraumatic needle at the factory. There are several advantages to having the needle pre-mounted on the suture. The doctor or the nurse does not have to spend time threading the suture on the needle. More importantly, the suture end of a swaged needle is smaller than the needle body. In traumatic needle with eyes, the thread comes out of the needle's hole on both sides. When passing through the tissues, this type of suture rips the tissue to a certain extent, thus the name *traumatic*. Nearly all modern sutures feature swaged atraumatic needles.

There are several shapes of surgical needles, including:

- straight
- half curved or ski
- 1/4 circle
- 3/8 circle
- 1/2 circle
- 5/8 circle
- compound curve



Three sutures to a person's right arm, near the elbow.

Needles may also be classified by their point geometry; examples include:

- taper (needle body is round and tapers smoothly to a point)
- cutting (needle body is triangular and has a sharpened cutting edge on the inside)
- reverse cutting (cutting edge on the outside)
- trocar point or tapercut (needle body is round and tapered, but ends in a small triangular cutting point)
- blunt points for sewing friable tissues
- side cutting or spatula points (flat on top and bottom with a cutting edge along the front to one side) for eye surgery

Finally, atraumatic needles may be permanently swaged to the suture or may be designed to come off the suture with a sharp straight tug. These "pop-offs" are commonly used for interrupted sutures, where each suture is only passed once and then tied.

Sizes of sutures

Suture sizes are defined by the United States Pharmacopeia (U.S.P.). Sutures were originally manufactured ranging in size from #1 to #6, with #1 being the smallest. A #4 suture would be roughly the diameter of a tennis racquet string. The manufacturing techniques, derived at the beginning from the production of musical strings, did not allow thinner diameters. As the procedures improved, #0 was added to the suture diameters, and later, thinner and thinner threads were manufactured, which were identified as #00 (#2-0 or #2/0) to #000000 (#6-0 or #6/0).

Modern sutures range from #5 (heavy braided suture for orthopedics) to #11-0 (fine monofilament suture for ophthalmics). Atraumatic needles are manufactured in all shapes for most sizes. The actual diameter of thread for a given U.S.P. size differs depending on the suture material class.

U.S.P. Designation	Collagen metric diameter (mm)	Synthetic absorbable metric diameter (mm)	Non-absorbable metric diameter (mm)	American wire gauge
11-0			0.01	
10-0	0.02	0.02	0.02	
9-0	0.03	0.03	0.03	
8-0	0.05	0.04	0.04	
7-0	0.07	0.05	0.05	
6-0	0.1	0.07	0.07	38-40
5-0	0.15	0.1	0.1	35-38
4-0	0.2	0.15	0.15	32-34
3-0	0.3	0.2	0.2	29-32
2-0	0.35	0.3	0.3	28
0	0.4	0.35	0.35	26-27
1	0.5	0.4	0.4	25-26
2	0.6	0.5	0.5	23-24
3	0.7	0.6	0.6	22
4	0.8	0.6	0.6	21-22
5		0.7	0.7	20-21

6			0.8	19-20
7				18

Suture techniques

Common suture stitching techniques include:

- Simple (running or interrupted)
- Mattress
- Horizontal mattress
- Figure 8
- Continuous locking
- Subcuticular

Other facts

Tissue adhesives

In recent years, topical cyanoacrylate adhesives ("liquid stitches") have been used in combination with, or as an alternative to, sutures in wound closure. The adhesive remains liquid until exposed to water or water-containing substances/tissue, after which it cures (polymerizes) and forms a flexible film that bonds to the underlying surface. The tissue adhesive has been shown to act as a barrier to microbial penetration as long as the adhesive film remains intact. Limitations of tissue adhesives include contraindications to use near the eyes and a mild learning curve on correct usage.

Antimicrobial sutures

Another recent development in wound closure involves the use of sutures coated with antimicrobial substances to reduce the chances of wound infection. While long-term studies are not yet available, preliminary results indicate that these sutures are effective at keeping bacteria out of wounds.

See also

- Ligature
- Knots
- Sewing
- List of medical topics
- Davis & Geck

External links

- Comparison of different types of sutures on Tissue Reactivity and Knot Security (<http://cal.vet.upenn.edu/surgery/5100.htm>)
- Demonstration of suturing from medlib.med.utah.edu website (http://medlib.med.utah.edu/kw/derm/pages/prex_21.htm)
- Latest surgical suture patents information.

- (<http://www.qiaoyun.net/medicalsupplies/surgicaluture/surgicaluture.htm>)
- ResidentNet - Types of Sutures. (<http://www.residentnet.com/sutures.htm>)
- Ethicon Wound Closure Manual (http://www.jnjgateway.com/public/USENG/Ethicon_WCM_Feb2004.pdf)
- Luxilon Industries monofilament sutures (<http://www.luxilon.be/ENG/English.html>)

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Categories: Articles to be merged since September 2006 | Surgery tools

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